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Timothy Seed Production in Alberta

This publication is a general guide for timothy seed production. Local conditions and your experience as a producer should be kept in mind when using this guide.

Introduction

Timothy is a medium-lived, [illegible]nial bunchgrass that is winter hardy and persistent in the cooler and moister areas of Alberta. This grass is acid tolerant and does well on waterlogged and peat soils. It also grows well on clay, silt and sandy soils, where moisture is adequate. Timothy can withstand some spring flooding but is intolerant of salt and alkalinity.

Drought or low fertility severely affects seed production. Well fertilized soils receiving adequate moisture from early spring to early summer can produce above average seed yields.

Seed and Seed Yield

Timothy seed is small in comparison to most other common grass species. The bushel weight of timothy averages 44 to 48 lb per bushel. The small dense seeds (1.2 million seeds per pound) can make it difficult to calibrate the seed drill, seed at the proper depth and combine. Since the seed has a hull, improper harvesting can easily cause a high percentage (greater than 15 per cent) of hulled seed.

Timothy seed yields can vary greatly with the variety, location, management, moisture conditions and harvest conditions. The longterm average yield for Alberta is approximately 250 lb/acre, although yields greater than 600 lb/acre have been reported.

Before purchasing seed, check the potential of the variety for yield, growth characteristics and marketability. Before you buy seed ask for a seed certificate

Table 1 Canadian Timothy Seed Production

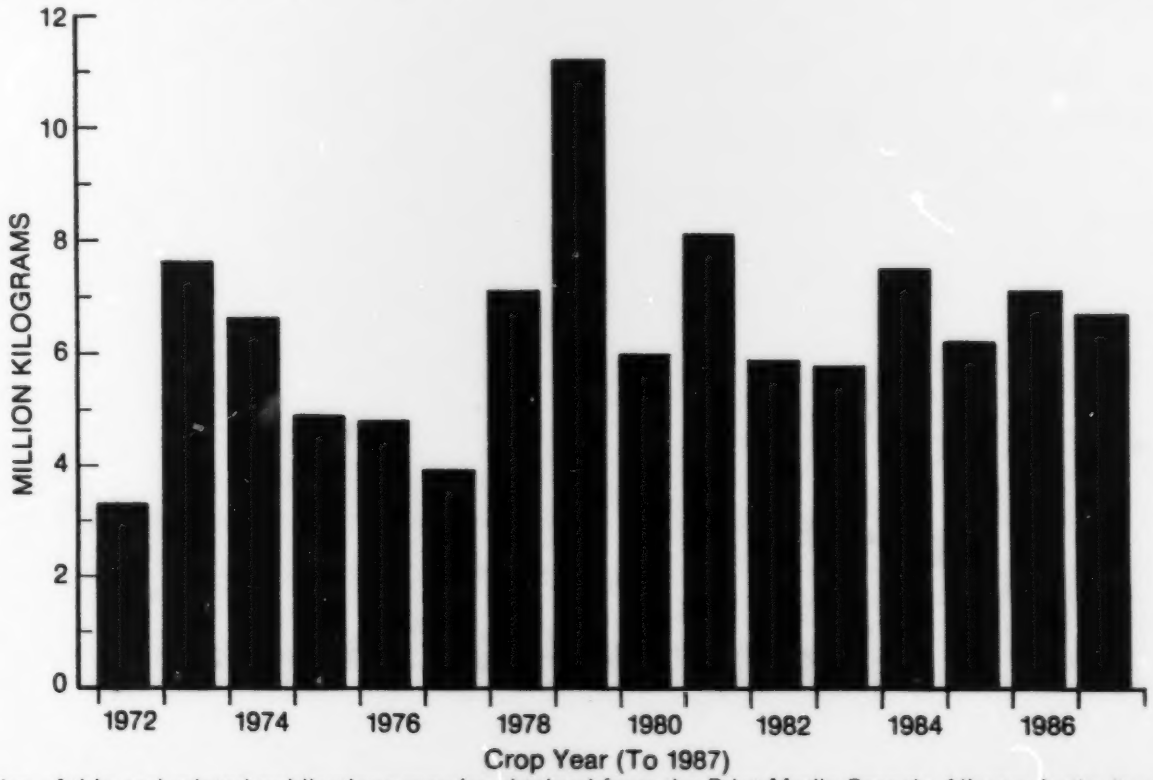

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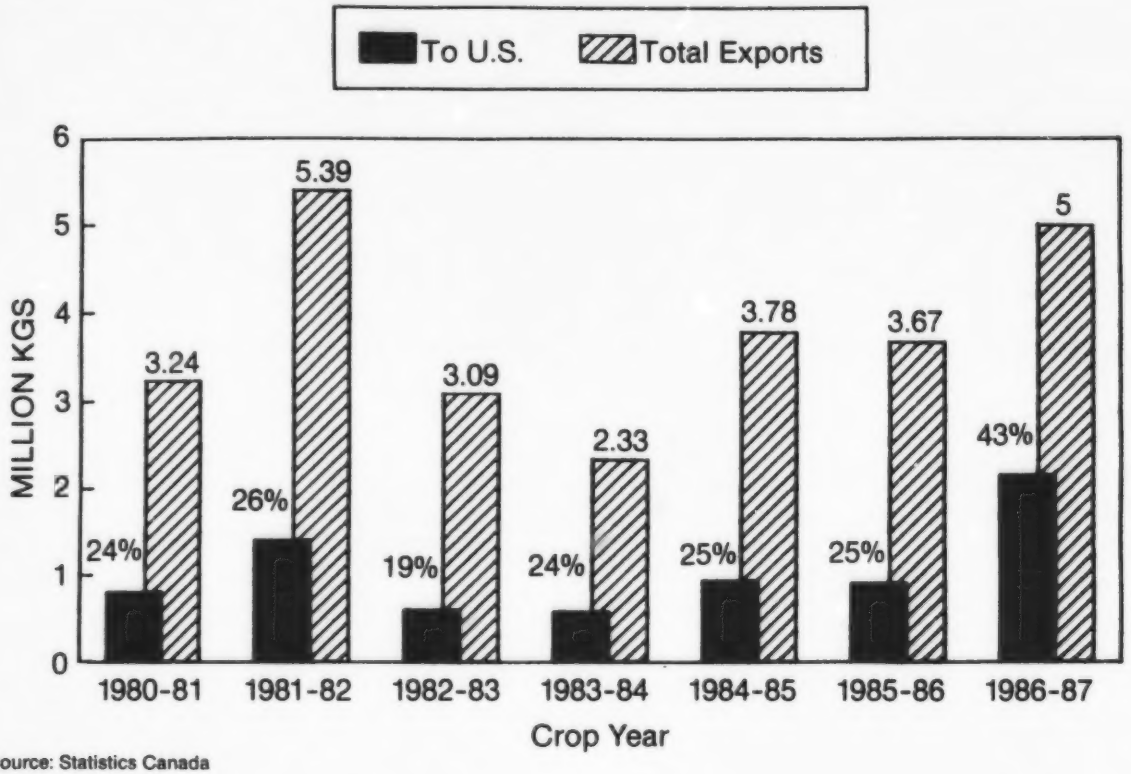
Table 2 Canadian Timothy Exports



Source: Statistics Canada

from the supplier. Examine the information on the certificate, paying particular attention to the types and number of weed seeds, regardless of the grade.

Pedigreed Seed Production

The Canadian Seed Growers' Association publication *Circular 6* has all the pertinent information on pedigreed crop regulations and procedures, including land requirements, crop standards, seed classes and inspection procedures.

Production Trends and Marketing

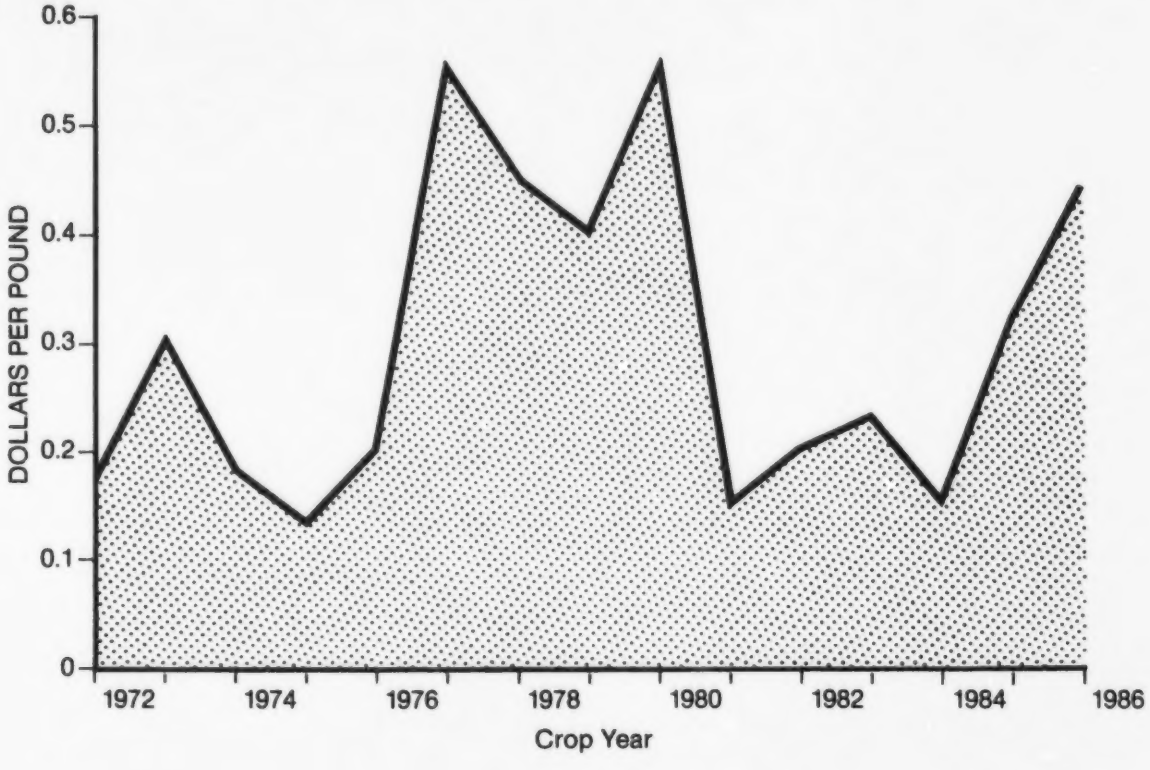
Timothy grown for seed is predominatly a Western Canadian crop. According to the 1981 Census of Agriculture, nearly 81,000 acres of timothy in Western Canada were harvested for seed in 1980. Nearly 45 per cent of the total was in Manitoba. Alberta's share was slightly over 40 per cent.

During the past decade, Canada's timothy seed production has averaged nearly 16 million pounds annually according to Agriculture Canada.

Annual exports of timothy seed have averaged over 9 million pounds in the 1980s. The major markets are Europe, Japan and the United States. Historically, the European countries as a group have accounted for two-thirds to three-quarters of Canadian timothy exports. Varieties grown under contract to the United States account for 25 per cent of annual exports while sales to Japan generally make up 5 to 10 per cent of exports. Domestic usage of timothy seed is not well documented. The difference between production and exports plus an allowance for timothy seed imports suggest the domestic market is the same size as the export market. This indicates that about 9 million pounds of timothy seed are absorbed into the domestic market every year.

Forage seeds exhibit wide fluctuations in price, and timothy seed is no exception. Average producer prices for timothy over the past fifteen years have ranged from a low of 13 cents per pound in 1975 to an estimated 65 cents per pound for the 1987 crop. Prices are responsive to changes in supply and demand. Large production increases without an offsetting boost in domestic and export demand are generally accompanied by sharply lower prices. Wide swings in prices are a recurring feature of forage seed markets. Prospective growers of timothy and other forage seeds should be aware of these fluctuations and plan future seed production accordingly.

Table 3 Estimated Average Price for Timothy Seed Received by Alberta Growers



Choice of Land

Timothy seed production requires adequate moisture; therefore, timothy is best suited to the Black and Grey Wooded Soil zones of Alberta and irrigation areas. Cool moist soils are ideal. Higher organic soils, which hold moisture, are preferable to sandy textured soils. An early spring flooded area will ensure that timothy receives this necessary moisture. Soils that have a high salt content or are alkaline must be avoided.

Land that has been treated with any of the following chemicals is subject to forage cropping restrictions: atrazine, Banvel, Glean, Ally, Princep, Edge, Rival, Treflan, Triflurex, Heritage, Fortress and Sinbar. Before seeding timothy, check the *Guide to Crop Protection in Alberta, Part 1 - Chemical,* Alberta Agriculture Agdex 606-l; *Weed Control in Forage Crops,* Alberta Agriculture Agdex 120/640-l; or the herbicide label for wait periods.

Clean land should be used for establishment of timothy stands. Any competitive perennial weeds, especially, should be controlled prior to seeding.

Field Sanitation

One cannot over emphasize the need for choosing a clean field that is free of perennial weeds such as Canada thistle, quack-grass and other grasses.

Because of similarities to the size of timothy seed, choose fields clean of Brassicas (mustards, canola) and clovers (especially alsike). The following weed seeds are also difficult to clean out of timothy: pigweed, chickweed, stinkweed, white cockle, narrow-leaved hawksbeard, cleavers, corn spurry and night flowering catchfly. The new Seeds Act regulations have lowered the allowable maximum number of certain seeds. Good field sanitation before seeding will ensure that high grade standards can be met.

Stand Establishment

Seedbed preparation - Perennial grasses, such as quackgrass, and Canada thistle must be controlled before seeding because they are difficult to control following seeding. A firm moist seedbed is required

for rapid and uniform germination. The best seeding depth is from 1/4 to I/2 inch. Research has shown that only 50 per cent of the seeds will germinate at a 1-1/2 in. depth and only 10 per cent of the seeds will germinate at a 3 in. depth.

For loam and peat soils, heavy packing is required before seeding and again after seeding, preferably with land rollers or a combination of land rolling before and using a press drill or Brillion seeder for seeding. A good rule of thumb to indicate adequate packing is a person's foot imprint should not be more than a 1/2 in. deep.

Clay soils and other soils with a crusting problem should not be pulverised and over packed. Leaving a cloddy appearance to the soil and using a press drill will provide sufficient packing and minimize crusting. Care should be taken so that drill setting will result in a 1/2 in. seeding depth. The press-wheel should follow in the seed row. Do not use harrows behind the press wheels because harrows will re-bury some of the seed too deep.

Seeding Date - Timothy should be sown as early as possible but no later than mid-June. Timothy does, however, tolerate later seeding but this seeding should only be attempted if excellent soil moisture conditions exist and the timothy is seeded without a companion crop.

Row Spacing - Although broadcast seeding and 6 inch row spacings are most common, some studies have shown seed yield increases with a 12 in. row spacing. A 12 in. row spacing is beneficial only in areas where moisture is limiting.

Seeding Rate - A seeding rate of 2 lb/acre (range 2-4 lb/acre) provides a good stand. Higher rates should be used if a companion crop such as barley is seeded. Due to its small seed size, timothy seeded at 2 lb/acre will have 26 seeds per foot of drill row in 6 inch spacings and 52 seeds per foot of row in 12 inch spacings. Seed drills must be calibrated when small seeds like timothy are sown. Higher seeding rates can be used if establishment has been unsuccessful in the past. However, a better stand and higher seed yield will be obtained if the soil or establishment problem is solved rather than resorting to a higher seeding rate.

Poor establishment is due most often to seeding too deep in an unpacked seed bed rather than using a low seeding rate.

Companion Crops - Companion crops compete with the timothy seedlings and cause reduced stands and lower seed yields the following year. Timothy has only a medium tolerance to competing crops. Research has shown no timothy seed yield differences, based on three seed harvests, between companion crops. The lower the yield of the companion crop, usually the higher the subsequent yield in the timothy seed crop will be. It is preferable to silage the companion crop in late July or else seed the timothy without a companion crop, especially on peaty soils. Avoid companion cropping with canola because seed from volunteer canola is difficult to separate from timothy seed in the subsequent year.

Fertilization Establishment Year

Soil test in the fall or just prior to seeding. Follow the soil test recommendations and apply phosphate (up to 50 lb P_2O_5/acre), sulphate (up to 20 lb SO_4/acre) and potassium (if required) for the life of the stand at the time of seeding. Usually enough nitrogen is provided with this blend for proper establishment in the first year. If further nitrogen is required, the blend can be adjusted accordingly.

This complete blend can either be banded into the soil or broadcast and worked in before seeding.

Production Years

Timothy has a high requirement for nitrogen with a yearly minimum of 50 lb actual N/acre needed for average yields. Producers targeting for optimum yields should apply at least 80 lb actual N/acre annually. The preferred nitrogen source is ammonium nitrate, but urea can be used if special care is taken in timing the application to minimize volatilization losses. Uniform spread of all fertilizer applications is vital for obtaining even growth and uniform crop maturity. Older stands may require more nitrogen to produce consistent seed yields.

Floral initiation has very specific timing requirements for nitrogen. Because timothy initiates floral parts later in the fall than other grasses, nitrogen timing is also later. The preferred dates for fertilizing are either late fall (mid to late October) or early spring (mid to late April) before any new growth starts.

Established timothy stands that require additional phosphorous, potassium or sulfur should receive a broadcast fertilizer application in early fall after harvest.

Weed Control

Weeds should be controlled in timothy stands since they can reduce the yield and quality of timothy seed, create harvesting problems and add to seed cleaning costs.

Purchase timothy seed that is free of troublesome weed seeds. Use pedigreed seed and carefully check the seed testing certificate for weed seed content.

Seed on clean land. Problem perennial weeds, such as Canada thistle, perennial sow-thistle, toadflax and quackgrass, should be controlled with tillage and/or a herbicide such as Roundup before seeding. Any other agronomic practice that contributes to the quick establishment and maintenance of a vigorous, highly competitive crop stand will aid in reducing weed growth.

Herbicides should only be used when needed and should supplement but not replace good cultural control of weeds. Timothy is susceptible to injury from a number of different herbicides. Therefore, it is important to follow label directions closely and not to exceed the recommended rate of application. See the *Guide to Crop Protection in Alberta, Part 1 - Chemical,* Alberta Agriculture Agdex 606-2 or *Weed Control in Forage Crops,* Alberta Agriculture Agdex 120/640-1 for herbicides registered for use on timothy for seed production.

Do not use herbicides that are not registered for use on timothy since they can cause extensive injury to timothy, including underseeded timothy. In research trials, Poast, Fusilade, Hoe-Grass, Mataven, Banvel, Blagal, Glean and Ally have caused injury to timothy. The soil incorporated herbicides, Avadex BW, Edge, Fortress, Treflan, Rival and Triflurex can seriously injure timothy as well.

In the year of seeding, early control of annual weeds with a herbicide or mowing above the seedling timothy will reduce the competition from a heavy stand of weeds. Reseeding bare spots in early spring will help to reduce future weed infestations. Many annual broad-leaved weeds can be controlled by 2,4-D amine or MCPA amine, but rates of these herbicides should not exceed 0.45 L/acre (500 g/L formulation) in the year of seeding. Applications should be made when the timothy seedlings are in the 2-4 leaf stage. Do not apply 2,4-D or MCPA in the fall of the year of seeding because the timothy seed yield may be drastically reduced the following year.

Extreme care should be exercised when applying herbicides to established stands of timothy used for seed production. 2,4-D or MCPA can be applied at rates of 0.45 L/acre or less (500 g/L formulation) just before the shot blade stage in late May. Applications at this time usually combine maximum crop tolerance with maximum weed susceptibility.

When perennial weeds are a problem in an established stand of timothy, they can be controlled by hand roguing smaller numbers and either mowing or spot spraying patches with a herbicide such as Roundup. The spot spraying will suppress or kill the timothy. If weed problems are severe, the first production year should be cut for hay.

Insect Control

Silvertop of Timothy

Plant bugs cause *silvertop* in timothy. The condition is characterized by a bleached, dead seed head and stem above the last node but a healthy flag leaf, sheath and lower stem. These symptoms appear soon after head emergence, usually before the seed head has fully expanded. The lower end of the stem is usually shrunken, darkended and necrotic and can be pulled out of the flag leaf sheath.

Adult plant bugs are small (4 to 9 mm long) winged insects which range in color from pale green to greenish brown or black. Some species are oval-shaped and others are long and slender. Their wings are folded flat on their backs, the upper part of the forewings being somewhat leathery and the lower part membranous. The nymphs pass through five instars before becoming adults. The first instar is very small while the fifth instar is about the size of the adult. Nymphs lack wings and can be distinguished from the adults in this way. The older nymphs have small wing pads, which eventually form into wings. The plant bug species responsible for causing silvertop in Alberta timothy stands are unknown at this time.

Plant bugs cause damage during the preheading stage by feeding on the plant stem through the leaf sheath. The plant bugs have sucking-piercing mouthparts which they use to withdraw plant sap from the grass stem. The results of feeding are a shrivelled and constricted stem and death of the stem and seed head above the feeding point.

Some plant bug species overwinter as adults and lay eggs in the spring. Other species overwinter as eggs in the grass stubble and the nymphs hatch in the spring. Depending upon the species there is either one or two generations of plant bug during the growing season.

At present there are no recommendations for controlling the plant bugs that cause silvertop.

Harvesting

Special attention to details is essential during the harvest process. Most timothy seed losses occur because of shattering, improper windrowing and incorrect combine settings.

Swathing

Although timothy is easily shattered, it should not be swathed too early. Observe the field carefully and swath them when there is a *trace* of shattering and the heads are gold colored at the base. This corresponds to a 40-45 per cent moisture content based on the entire head clipped off at the base. Some producers use the hand shattering technique

to determine the moisture content of timothy. It is done by holding several timothy heads by their stems and lightly slapping them against the palm of the other hand. If any seed shattering occurs, start swathing. The best quality seed is the early set seed. Swathing before any shattering losses of early seed occurs will produce a better seed product.

Adjust the swather to lay heads into the centre of the swath rather than flaring individual heads to the outside. This will help to keep shattered seeds on top of the swath if constant rain *tenderize* the crop. Swathing at night and in early morning will reduce shattering if the crop is over ripe. Do not swath wider than 14 feet in very heavy crops. Bulky swaths are possible if the cutting height is increased. This may also reduce the amount of weeds and other volunteer crops, such as alsike clover, in the swath. Wide swath are also possible if a large combine capacity is available.

Combining

Allow five to fourteen days from swathing until combining, depending on the weather conditions and the shattering ease of the variety.

Carefully check through the entire combine for leaks and seal them with tape or caulking compound.

Belt or draper pickups that match pickup speed to ground speed are better than drum type pickups and will minimize seed shattering and seed loss at the pickup.

Combine settings will vary but this is one successful sequence. Replace worn concaves since they require a very close setting to remove the seeds from the heads. This would result in over threshing at the cylinder and can cause over loading of the sieves and dehulling of the seed. Concave clearance should be from 3/16 to 3/8 inch at the front, and from 1/16 to 1/8 inch at the rear. Filler bars may be needed to completely thresh the heads of hard to thresh varieties. As a rule hulling and straw chaff increase if the clearance is too small and some heads remain unthreshed if the clearance is too wide. Reduce cylinder speeds to 600 to 800 rpm. The setting will depend on the variety and field conditions.

Sieve and air separation adjustments vary greatly. Set adjustable top sieves to 1/2 inch. The preferred bottom sieve is a 1/16 inch round hole selve, but an adjustable bottom sieve is needed if you have a wild oat problem. Wild oats will quickly plug the round holes. You will get the best separation with high volume, low velocity air and a fan shaft speed setting of 400 to 650 rpm. A grass seed attachment fan is required to obtain this reduced fan speed. Increase fan speed until you get a clean sample. If there are unthreshed heads and seeds in the straw, a slower ground speed is usually the answer.

Always hands seed with clean equipment including augers, trucks and bins. Seed moisture should be 12 per cent or lower when tested. If the weather's hot, a lower moisture content is required. Timothy seed will heat quickly if you combine it above 12 per cent moisture. Timothy seed should be aerated immediately before final storage, to ensure moisture content is low enough.

Aftermath Removal

Some growers will reswath a field after combining to remove all stubble and aftermath. Bale the aftermath as soon as possible. Burning the residue may damage the soil. Research studies have shown that removing all herbage by September 15 increased seed production by as much as 20 per cent in the following year.

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